CUTEC News

"R4" LAUNCHES

EDITORIAL

LOWER SAXONY ENERGY SCENARIOS 2050

Dear Reader,

Renewable energy sources are a key factor in the energy system. In 2014, renewables accounted for over 25 percent of Germany's gross electricity generation. The state of Lower Saxony has a leading role in this progress in national comparison, and makes the most contribution in terms of electricity feed-in tariffs under Germany's Renewable Energies Act (EEG). As well as supplying electric power, the plants of renewable energies will perform system management and stabilisation functions in future, as the existing conventional large-scale facilities – in particular nuclear and coal-fired power plants – are gradually being shut down.

This structural change currently focus on the electrical energy system in particular. Therefore, the energy transition policy at present largely impact on the electricity sector. The electricity sector, however accounts for less than a quarter of Germany's end-user energy consumption, despite the production of roughly 40 percent of the country's CO_2 emissions. The rest of the end-user energy consumption is attributed to the heat and motor fuel sectors. Nevertheless, in the long term, climate change demands complete decarbonisation of energy supply systems, entailing the elimination of fossil fuels.

It is relatively easy to implement this, with renewable energy sources, in particular wind and solar power in the electricity sector. In the transport sector, some modes, such as the railways and passenger cars can be run electrically using renewable energy. Some areas of the raw materials industry, such as electro-steel production and aluminium electrolysis, are likewise already electricity-based, and so by the same token can continue to run using renewable energy.

By Contrast, other means of transportation, such as ships, aircrafts and many other areas of raw materials industry, will probably stay dependent on the gaseous or liquid energy sources (hydrogen, hydrocarbons) in the long term. They can in principle also be produced by Conversion processes using renewable electricity. Firstly, by electrolysis, directly producing hydrogen; and secondly, by means of further reaction with carbon dioxide from biomass or industrial processes to produce hydrocarbons. These technologies – known as Power-to-Gas/Liquid – will see conversion for electric power generation and for material use converge more closely in future energy systems. In other words a holistic view will be required.

Against this background, the Department of Energy System Analysis is developing scientific models and scenarios depicting how electricity, heat, transport and industrial sectors can be fully converted to renewable energy sources in the long term. In addition to studying local energy concepts, such as of industrial centres, the simulation of larger cross-sector energy systems will also be carried out. At present, the Department is developing the "Lower Saxony Energy Scenarios 2050" on behalf of the Lower Saxony Ministry of the environment, Energy and Climate Protection in a joint project with the Lower Saxony Energy Research Centre, the Ostfalia-Hochschule academy and the Leibniz University in Hanover. The project is analysing the aforementioned cross-sector energy supply based on renewable energy sources for the state of Lower Saxony. It includes the creation of "backcasting" scenarios describing technically feasible target states for the year 2050.

I very much hope you enjoy reading this issue of CUTEC News.

With best regards from Clausthal-Zellerfeld,

Jens zum Hingst

ANNIVERSARY SUMMER FESTIVAL 2015

The CUTEC Institute's Anniversary Summer Festival began with a video message from State Governor Stephan Weil.

The symposium focused on the role of CUTEC in shaping the reversal of energy policy – especially in Lower Saxony – provided the opportunity to retell some of the anecdotes from the early days of the environmental institute. High-calibre speakers provided the more than 200 visitors with interesting and entertaining presentations on the latest developments.

A highlight of the symposium was the talk by State Secretary Almut Kottwitz

The many guests enjoyed coffee and cake, as well as tasty barbecue specialities

The visitors subsequently had the chance to see and touch some of the revolutionary new developments in the energy sector in the course of demonstrations of selected work fields, pilot plants and laboratories. The e-mobile units on show enabled them to try out the ideas in practice. A jazz combo from Hanover provided the musical ambience for the event until late into the evening.

Only the weather was a little disappointing. The inviting buffet warmed the spirits, however, with barbecue specialities, cakes and beer.

For younger guests, there was warm popcorn to snack on, and the to-do list featured bubble-blowing, model-making, and painting. The paving stones on the site were still showing the artistic evidence of the event some days later.

And to all those who were unable to attend this time around: don't worry, there will definitely be another Summer Festival next year. The event has already been scheduled for June 9, 2016 – so be sure to save the date! We look forward to welcoming you as our guest on that day. (ro)

Music from the jazz combo entertained the guests

NEW COMMERCIAL DIRECTOR OF THE CUTEC INSTITUTE

Dipl.-Kaufm. Martin Eberhardt

Martin Eberhardt was appointed the new Commercial Director and member of the management of the CUTEC Institute with effect from August 1, 2015. He succeeds Klaus Sommer.

Martin Eberhardt studied business economics at the Georg August University in Göttingen. He began his career in the accountancy profession, which also saw him working at the CUTEC Institute previously. Having held various management posts in the steel industry and the machinery manufacturing sector, he latterly worked in the pharmaceutical industry as a commercial director. Martin Eberhardt has established commercial functions within companies, as well as initiating and implementing essential change processes. His professional experience will be particularly beneficial in driving forward the upcoming strategic and operational change processes.

Asked about his goals at the Institute, Eberhardt answered: "I will of course be looking to get to know my colleagues and familiarise myself with my new role as quickly as possible. A key concern for me, however, is to strengthen open and constructive collaboration between all the departments of the Institute. Not least, I aim to help make the CUTEC Institute a scientific and commercial success."

With regard to the future prospects of the Institute, Martin Eberhardt commented: "The CUTEC Institute must in part re-invent itself, becoming more flexible, and ultimately also more successful, than in the last 25 years, in order to fulfil the State's expectations of it, and to make it fit for the future. That will require change in all areas. The Institute has already achieved success in publicly grant-aided projects. It is now time for us to prove ourselves in the handling of industrial contracts too."

Martin Eberhardt is looking forward to working together closely and successfully with all the staff of the CUTEC Institute – and that has indeed already begun. (eb)

THE PERFECT START: BMBF RAW MATERIAL EFFICIENCY SPONSORSHIP PROGRAMME LAUNCHED

Great enthusiasm and commitment was devoted to preparing the launch event of the project sponsored by the German Federal Ministry of Education and Research (BMBF) titled "r⁴ – Innovative technologies for resource efficiency – Research for the provision of industrially key strategic raw materials" in Clausthal. For the next five years this new programme, with a total budget of 60 million Euros, will provide a research platform for some 50 joint projects involving partners from industry and science relating to the opportunities and risks of expanding primary and secondary raw material resources. Embedded in the "FONA" sustainability research framework programme, it will be implementing the BMBF's research and development programme to promote new key strategic raw materials for high-tech industries in Germany. The main aim of the programme is to investigate the potential and available techniques for exploitation of Germany's natural resources. Further areas of focus are recycling possibilities and the recovery of industrially key strategic raw materials from legacy deposits, residual materials and end-of-life products.

The launch event was held on June 10 and 11, 2015. Some 100 leading players in the raw materials and recycling research field from throughout Germany, as well as representatives of the funding institutions, gathered at the CUTEC Institute's home base in the Harz region. Their presence, and the papers presented, ensured that the event was a resounding success.

In his opening speech, Dr. Lothar Mennicken from the BMBF outlined the funding policy background and introduced the programme. He also clearly formulated its aims: to assure sustainable supplies of raw materials for Germany in future. He stressed in particular the desire to see the results of the research implemented in practice.

Enthusiastic about resource efficiency: Dr. Lothar Mennicken during his closing speech

Fully committed to resource efficiency: "r⁴" alliance coordinators and representatives of the BMBF

Guest speakers at the event were Dr. Volker Steinbach from the Federal Institute for Geosciences and Natural Resources (BGR), and Prof. Susanne Rotter from the Technical University of Berlin, who presented the current standing of research in their respective fields (primary and secondary raw materials) in Germany. CUTEC Managing Director Prof. Martin Faulstich in his introductory remarks again stressed the need for a new approach to raw materials, severing the link between economic growth and resource consumption.

Subsequently, the alliance coordinators of the 26 approved projects presented their innovative research ideas. Further projects will be assigned in early 2016 following a second round of approvals. The topics in relation to the mobilisation, recycling, exploration and recovery of raw materials were also reflected in the accompanying poster exhibition. It provided invited guest organisations to contribute their related projects and report on their latest results.

Another area of focus of the "r⁴" programme is the development of young scientists and the promotion of international collaboration, including through junior groups and networking projects. The Hochschule Pforzheim academy presented a "junior researchers' kiosk" to that end at the launch event.

The attendees made full use of the opportunities to question and discuss other projects. The interchange and mutual familiarisation was also maintained intensively during the breaks and at the evening event. The attendees were enthusiastic and highly positive in their reactions. There was a marked sense of excitement about what was being instigated. And some initial cross-project networking has already taken place.

The organisers Dr. Britta Kragert and Dr. Torsten Zeller from the co-ordinating CUTEC Institute were consequently happy too. They saw that a valuable foundation had been laid in efforts to turn the participating resource researchers into a large, efficient "r⁴ family" in future – one of the stated aims of the leading figures behind the accompanying integration and transfer project (INTRA). Alongside CUTEC as the alliance coordinator, four other institutions are participating in the project: the Fraunhofer Institute for Systems and Innovation Research (ISI), the Federal Institute for Geosciences and Natural Resources (BGR), the Karlsruhe Institute of Technology (KIT) and the Hochschule Pforzheim.

In his closing statement, Dr. Mennicken spoke appreciatively of the "positive spirit" of the event, and expressed his thanks to the hosts for their accomplished organisational efforts. His words of praise also represented a motivation: Based on the highly positive experience of the launch event, the next major gathering of the "r⁴" alliance, with presentation of initial results, will again be in Clausthal. The new projects from the second round of approvals will then also have the opportunity to present their specific topics.

Over the coming months, members of the INTRA team will be visiting the individual alliance projects on-site in order to identify linkages within the various alliances and create corresponding thematic clusters. We are very much looking forward to those next steps! (kra/ze)

REWITA: NEW RESEARCH PROJECT FOR THE DEPARTMENT OF METAL RECYCLING

GEFÖRDERT VOM
Bundesministerium für Bildung und Forschung

On May 1st, the 36-month alliance project titled "REWITA" was launched, relating to the recycling of mining residues for the recovery of industrially key strategic metals based on the example of tailings from the Bollrich area in Goslar. The project is being financed as part of the BMBF's sponsorship programme "r⁴ – Innovative technologies for resource efficiency – Research for the provision of industrially key strategic raw materials". The project is embedded in the BMBF's programme to promote new key strategic raw materials for high-tech industries in Germany, as part of its "FONA" sustainability research framework programme.

The project was instigated and developed within the Lower Saxony Recycling Cluster for industrially key strategic metals (REWIMET), of which CUTEC is a founding member. All the project partners are also members of REWIMET: The Technical University of Clausthal with its Institutes IFAD (Prof. Daniel Goldmann), IBB (Prof. Oliver Langefeld), IELF (Prof. Kurt Mengel), IGMC (Prof. Norbert Meyer); as well as the industrial companies PPM Pure Metals GmbH, Langelsheim, Harz-Metall GmbH, Goslar, Stöbich Holding GmbH & Co. KG, Goslar, pdv software GmbH, Goslar, and Prof. Burmeier Ingenieurges. mbH, Gehrden.

Based on the example of the mine ponds in the Bollrich area between Goslar and Oker, the project will investigate whether recovery of industrially key strategic raw materials such as indium, gallium and cobalt from the site is economically viable. Reprocessing methods will be developed and tested on original samples in the course of laboratory and pilot plant scale experiments. The initial aims will be to develop suitable extraction strategies and techniques, and following on from the reprocessing stage to devise methods for the re-installation of the newly created residues and to clean discharged water. The reprocessing strategy will be based on a holistic approach, aimed at utilising all occurring substance fractions as far as possible. Communisation of the industrially key strategic elements with sulphidic minerals will achieve enrichment in the course of recovering a non-ferrous metals fraction. The technological developments will be accompanied by the planning of a potential infrastructure for future raw material recovery operations, as well as the clarification of approval issues and other parameters essential to an overall economic and ecological assessment. This will ensure the maximum possible technical and economic usability.

CUTEC is actively participating in the "reprocessing of pond material", "process monitoring and data processing", "economic usability and transfer" work packages, as well as having been assigned to lead and co-ordinate the project through Dr. Torsten Zeller.

The scientific and technical innovation of the project lies in its first-time development and adaptation of new extraction and processing methods and techniques for the logging and exploitation of a secondary raw material deposit, including the metallurgical recovery of industrially key strategic metals, in particular indium, gallium and cobalt.

Specific innovations targeted are:

- The development of methods for the modelling of anthropogenic, stratified and fluviatile deposits;
- The development of new, energy-efficient extraction and recovery technologies devised on the basis of the experience gained from the extraction and recovery of mine pond material which can be used for other, similar problem cases;
- The development of flotation techniques for mineral phase deposits that have already come into contact with reagents and been superficially changed. To this end, the initial aim is to achieve energy-efficient decomposition with minimised spread of the grain band based on the application of new milling technologies projected to extend to the < 20 µm grain size range. Secondly, to achieve desludging of the ultra-fine grains, where appropriate in new separator units, with minimised loss of usable material. Thirdly, based on newly developed mining chemicals, to develop a new reagent regime for flotation which is highly eco-friendly in line with present-day environmental standards and yet operates selectively and efficiently in the ultra-fine grain size range. Fourthly, to design the flotation process flow conditions using suitable apparatus in the cells such that efficient large-scale technical implementation is conceivable.
- Finally, to develop techniques for the hydrometallurgical recovery of special metal concentrates from the non-ferrous metals flotation concentrates, bypassing the normally and originally interposed pyrometallurgical process stage.

Location of tailing ponds at the Bollrich in Goslar

CUTEC would like to thank the BMBF for its grant funding, and looks forward to a successful implementation phase. We are glad to take this opportunity to report on the progress of the project. (ze)

THERMAL SEWAGE SLUDGE TREATMENT AND NUTRIENT RECOVERY

gefördert durch DBU Deutsche Bundesstiftung Umwelt www.dbu.de

The coalition agreement between the governing parties for the 18th legislature period of the German Federal Parliament states: "We will terminate the use of sewage sludge for fertilising purposes and recover phosphor and other nutrients" [1]. The provisions stipulating a switch from the former soil-based sewage sludge recovery to technical phosphor recycling will form part of the new Sewage Sludge Regulation, which will thus also include a general prohibition of the agricultural use of sewage sludge [2].

The recovery of phosphor can begin right from the treatment plant. The efficiency levels attained are, however, well below those of recycling from mono-combustion ash [3]. A variety of different technologies have been developed in Germany [4].

The German Federal Government is currently planning to enforce the prohibition with effect from January 1, 2025. As a consequence, various bodies throughout Germany have started planning for the regional recovery of sewage sludge. The CUTEC Institute drew up a wide-ranging study on behalf of the Cologne municipality sewage utility for sewage sludge disposal in the state of North Rhine-Westphalia during 2014/15, and in 2015 produced a study on cost trends for a cooperative sewage association.

The questions raised by sewage sludge producers are always similar:

1. Will available mono-combustion capacities be sufficient?
2. What if they are not?
3. What is the trend in disposal costs?
4. How can the requirements for phosphor recycling be developed in a commercially viable way?

Incineration is the standard method for the thermal elimination of sewage sludge. However, many local authorities are looking to run their own, small-scale plants, in order to assure disposal at calculable cost under their independent control. Potential methods include pyrolysis (a technique excluding the use of oxygen), gasification (with oxygen deficiency) and hydrothermal carbonisation (HTC).

Photo: de.wikipedia.org

Sewage sludge with desiccation cracks

There is great interest on the part of environmental policy-makers in setting forth the fundamental thermo-chemical alternatives which might be applied in planning procedures in the federal states. Consequently, the German Federal Environmental Foundation (DBU) in Osnabrück commissioned the Department of Thermal Processes
to undertake a research project relating to thermo-chemical alternatives for incineration and nutrient recovery. The aim is to produce a technology assessment of thermo-chemical sewage sludge conversion techniques as alternatives to incineration, paying special attention to potential for nutrient recovery. In the combustion process, nitrogen is discharged into the flue gas as NO_x, and is lost to the recovery process. In oxygen deficiency-based methods, however, most of the content is converted into ammonia (NH_3). This compound can be washed out in simple water-based washers. Consequently, the term "nutrients" refers to the elements phosphor, nitrogen, potassium, calcium and sodium.

The launch of the 18-month project was scheduled for July 20, 2015.

The work plan provides for a mix of theory and experimentation on CUTEC installations. Following on from the PROJECT ASHES approved with effect from April 1, 2015, this is the second project within a short space of time relating to thermo-chemical research into nutrient recovery. The Institute will thus be in a position to make important practical contributions to the field of nutrient recycling from hydrocarbon-based solids over the coming years. It is notable, especially, that the issues concerned are international in nature but also solvable locally. That is because Lower Saxony is one of the federal states of Germany which has to date not had a single mono-combustion sewage sludge incineration plant. Instead of bemoaning the nutrient surpluses in the water and soil, here, too, in future policies relating to nutrient recycling will be in demand. (vo)

[1] Coalition agreement for the 18th legislature period of the German Federal Parliament: Shaping Germany's future; section on Protection of water courses and oceans; Verlag Union Betriebs-GmbH, 12/2013, p. 84

[2] Bergs, C.-G.: Legal framework for future sewage sludge disposal and phosphor recovery; 27th Aachen Colloquium on Waste Management 2014, 27.11.2014, published by: Prof. Dr.-Ing. J. Pinnekamp, ISBN 978-3-938996-91-1

[3] Pinnekamp, J.; Montag, D.: Future sewage sludge disposal in North Rhine-Westphalia; 2nd Workshop, StEB Cologne, 22.09.2014

[4] Adam, C.; Simon, F.-G.: Phosphor recovery in municipal sewage treatment; ProcessNet Committee on waste treatment and Material Recycling, Fichtenau-Neustädtlei, 7.+8.10.2010; derived from dissertation: Montag, D., RWTH Aachen, 2008

ENVIRONMENTALLY FRIENDLY FLOCCULANT FOR WASTE WATER TREATMENT

Limited availability, rising prices and the negative impact of the use of fossil raw materials on the climate are encouraging the use of regrowable resources. By substituting for fossil raw materials, regrowable resources can play a major role in achieving Germany's and the European Union's ambitious climate protection goals.

CUTEC sludge treatment pilot plant
Contact:
michael.niedermeiser@cutec.de

The CUTEC Institute has made a positive contribution to this based on the successful implementation of results from a project sponsored by the Regrowable Resources Agency (FNR) (project reference AZ 22018605). The potato-starch based flocculants developed in this project led by Prof. Sievers as part of a development cooperation with the Emslandstärke company in Emlichheim, Germany, have been translated into various products and now permit a wide variety of potential applications, including in sewage and sludge treatment. The new products offer major advantages over polymer flocculants based on mineral oil. In addition to biodegradability and much lower toxicity (Note: the monomer acrylamide – an unavoidable constituent of the mineral oil-based polymer polyacrylamide – is potentially carcinogenic), these include easier processing of the concentrates to produce ready-to-use solutions and avoidance of operational problems such as loss of efficacy due to depositing of the solution and "sticking" of filter cake on the filter plates.

METHA plant in Hamburg

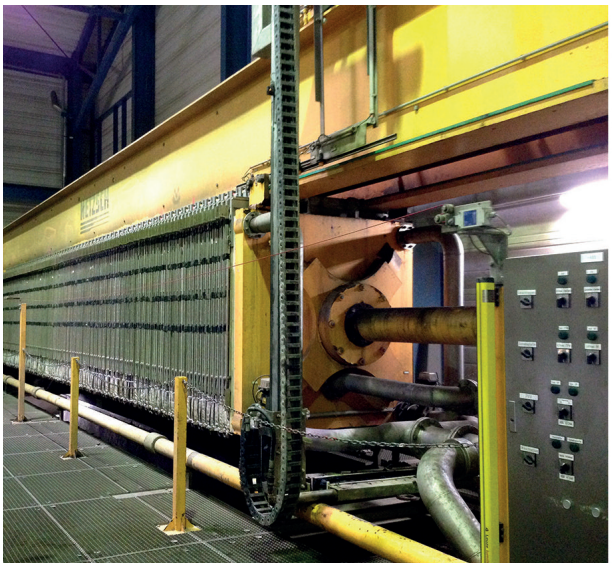
Nevertheless, economic viability must be investigated in each individual case. To that end, CUTEC supports potential users through technical tests and piloting (picture above left), based on establishment of the benefits of such testing in advance by preliminary research.

A successful example, and a particularly strong reference project, is the port of Hamburg.

With some 10,000 ships arriving each year, almost 300 berths along a total of 43 kilometres of quayside for ocean-going ships, more than 1,200 goods trains per week and four container terminals, it is one of the most efficient universal ports in the world. It handles 145.7 million tonnes of cargo a year (picture below left).

Some 3 to 4 million cubic metres of sediment a year is dredged from the river Elbe and Hamburg's harbour in order to develop the port and keep shipping lanes free. Whereas at most ports around the world such sediment is dumped at sea, the contaminated material dredged from Hamburg harbour is mechanically treated at the METHA (mechanical separation of harbour sediment) plant operated by the Hamburg Port Authority (HPA) and largely recycled (picture above centre). Every year, over 550,000 tonnes of dry harbour sediment has to be flocculated and dewatered by means of chamber and belt filter presses (picture below). With the new products the METHA plant not only implements a more environmentally sustainable solution, but also simplifies operations. More information is contained in the press release issued by the FNR on July 1, 2015 headed "Port of Hamburg treating harbour sediment with starch-based biodegradable flocculants" (www.fnr.de/presse/pressemitteilungen). (si)

Port of Hamburg



Membrane filter press, bottom left; filter cake compressed with starch, right

CUTEC ON THE ROAD

ACHEMA 2015

This year's ACHEMA – the world's largest trade fair for the process industry, process engineering and biotechnology – was held in Frankfurt from June 15th to 19th. Some 3,800 exhibitors from all over the world presented their processes, services and products. Keynote topics at ACHEMA were:

- Industrial water engineering,
- process analysis and
- bio-based products.

Interested visitors discover all about bio-electrochemical fuel cells on the CUTEC stand

The CUTEC Institute exhibited a functional laboratory-scale bio-electrochemical fuel cell. Under the title "Bio-electrochemical fuel cells as the building blocks of an energy-producing treatment plant", its ongoing development is being sponsored by the German Federal Ministry of Education and Research (BMBF) as part of its Sustainable Water Management programme "NaWaM".

The numerous visitors to the CUTEC stand were also provided with detailed insights into the Institute's full breadth of work in the field of environmental and energy technology. Some lively debate was instigated, particularly in relation to the production of alternative fuels by PtL (Power to Liquid). PtL utilises surplus electricity to produce hydrogen by electrolysis. The hydrogen combines with CO_2 to form synthesis gas, and is further processed into fuel in Fischer-Tropsch plants. The plants have been constructed on a pilot plant scale, and accordingly some interesting starting points for projects were derived. (wo)

ANNUAL LOWER SAXONY MUNICIPAL WATER MANAGEMENT CONFERENCE

Wasserverbandstag e.V.
Bremen | Niedersachsen | Sachsen-Anhalt

On June 25 and 26, 2015 the power station at Lüchow played host to the annual conference of the heads of Lower Saxony's municipal water management corporations. The event was held under the auspices of the Wasserverbandstag e.V., a water association serving as an umbrella organisation representing the interests of many individual water and soil associations in the states of Lower Saxony, Bremen and Saxony-Anhalt, providing support to them in carrying out their tasks in relation to water management, drinking water supply and waste water disposal, as well as flood protection. This year's event was hosted by the Wendland water association.

On the conference agenda were general political and technical trends in the drinking water and waste water fields, the implementation of new regulations, and local trends within the associations. This year's keynote topics were the presentation of an updated situation report on plant protection products in the ground water, the prospects for phosphor recycling in the waste water treatment sector, and a planned image campaign by the waste water associations.

The CUTEC Institute supported the event through a presentation by Hinnerk Bormann (Dipl.-Ing.) on "The possibilities and potential of phosphor recycling in the water management sector". The presentations were met with lively interest from the more than 30 heads of drinking water and waste water associations in attendance, and there was general consensus that the issues considered merit more attention from policy-makers in future given their importance to the preservation of life. (bo)

GERMAN FLAME DAY

The 27th German "Flame Day" conference returned to Clausthal once again on September 16 and 17, 2015. It was attended especially by large numbers of young doctoral candidates from all over Germany. Acting as host for the third time following 1977 and 1993, the Technical University of Clausthal offered the approximately 110 visitors an interesting programme. The event was chaired by Prof. Klaus Görner from the University of Duisburg-Essen under the auspices of the VDI Knowledge Forum.

The colours yellow, green, blue and red were predominant features of the presentations given. This reflected the fact that CFD* simulation has become established at many of the research institutions working on the Flame in recent years. Almost all doctoral candidates are now using this high-end software tool to support their practical experiments.

Dr. Vodegel (l.) during his presentation

Dr. Vodegel presented the results obtained by CUTEC from as part of the AiF "Process-oriented biomass assessment" project. Without CFD simulation, mass, energy and material flow balances for pyrolysis and gasification of thermo-chemically difficult biomasses were presented. Other new results presented were findings relating to the thermal behaviour of ash, obtained from an apparatus set up for the first time.

Representatives of companies and research institutions used the Flame Day as an opportunity to get to know CUTEC. Two discussion sessions and site tours over a period of several hours on the Thursday and Friday respectively offered a framework to consider possibilities for cooperation. (vo)

*Computational Fluid Dynamics

SCIENTIFIC ADVISORY BOARD

Profile in this issue: Dr. Volker Steinbach

Dr. Volker Steinbach

In Dr. Volker Steinbach, the Scientific Advisory Board has one of the most prestigious natural resource experts in Germany among its members.

Born in 1961, Volker Steinbach is head of the Department of Energy Resources and Mineral Resources of the Federal Institute for Geosciences and Natural Resources (BGR). He has been working in the field for almost 30 years. The focus of his work is on mineral and energy resources, both as an advisor to policy-makers and industry, and in raw materials research.

"The future viability of Germany as a centre of technology and export-led industrial nation is essentially linked to secure, sustainable supplies of raw materials. The efficient and environmentally friendly use of energy and mineral resources is equally essential. The translation of results from basic research into practicable technologies can only be assured over the long term by broad-ranging cooperation between the various disciplines, particularly raw materials and geosciences, as well as material sciences and process engineering. As a geoscientist and natural resources specialist, I am looking to strengthen process-oriented, systemic approaches in research projects in conjunction with CUTEC."

Volker Steinbach's scientific career path was clear from an early stage: From 1980 to 1985 he studied geology at the Technical University of Freiberg Mining Academy. He subsequently acquired his doctorate with a thesis on "The structure and development of carbonic molasses in the Delitzsch-Bitterfeld area". Between 1988 and 1990 he spent two years conducting research at the China University of Geosciences in Wuhan. He then began his career with the BGR as a member of the scientific staff, initially responsible for the South East Asia Raw Material Economy division. From 1998 to 2000 he was seconded as an advisor to the German Federal Ministry for Economic Affairs and Technology. In the year 2000 he returned to the BGR as head of the "International Cooperation Europe, CIS, Middle East and Central Asia" section, and from 2002 to 2007 he headed the "International Cooperation Europe, Asia, Oceania" section. In 2007 he was appointed head of the Department of Natural Resources, International Cooperation, and since 2009 has been head of the Department of Energy and Mineral Resources. Starting in 2010, he was responsible for establishing the German Natural Resources Agency (DERA), which since 2012 has been a section of the department.

Volker Steinbach has been a member of the Advisory Board of the German Society of Geosciences (DGG) since 2008, and is also a member of several scientific boards advising various federal government ministries.

CUTEC has repeatedly worked on joint projects with the BGR over many years. Since 2009, links have intensified through activities relating to metal recycling. In early 2015, the German Federal Ministry of Education and Research (BMBF) approved its "r⁴" programme relating to "Innovative technologies for resource efficiency – Research for the provision of industrially key strategic raw materials". The BGR and CUTEC are once again working together on a number of projects as part of that programme. Together with three other partners, they have also bee assigned to carry out the accompanying research to the overall project, with funding of 60 million Euros. (kra)

NEWS FROM THE CUTEC TEAM

Dipl.-Volksw. Klaus-R. Sommer

After 15 years' service to the CUTEC Institute, on August 3, 2015 Commercial Director and Authorised Signatory ("Prokurist") Klaus-Reinhard Sommer celebrated his well-deserved retirement with an official ceremony.

Klaus-Reinhard Sommer comes from Prezelle in Lower Saxony. He graduated in economics from the University of Göttingen. After holding senior posts with companies in the measuring instruments, asset management and education sectors, he became Commercial Director of the CUTEC Institute in the year 2000.

We wish Klaus Sommer all the very best for the future.

Dipl.-Ing. Andre Bertram

On September 1, 2015, Andre Bertram marked his first day's work in the CUTEC Institute's Department of Metal Recycling.

As a member of the scientific staff, the graduate engineer and journalist will focus on public relations work within the "r⁴-INTRA" team alongside the BMBF's sponsorship programme "r⁴ – Innovative technologies for resource efficiency – Research for the provision of industrially key strategic raw materials". (wes)

IMPRINT

Published by:
CUTEC Institut
Contributors:
Dip.-Ing. H. Bormann (bo)
Dipl.-Kaufm. M. Eberhardt (eb)
Dr.-Ing. B. Kragert (kra)
Dr. rer. nat. N. Roth (ro)
Prof. Dr.-Ing. M. Sievers (si)
Dr.-Ing. S. Vodegel (vo)
Dipl.-Ing. A. Wollmann (wo)
Dr. T. Zeller (ze)
Dr.-Ing. J. zum Hingst (zh)
Layout and setting: G. Wessels (wes)
Production and supply:
CUTEC Institut
Leibnizstr. 21
38678 Clausthal-Zellerfeld
Tel. 05323 933-0 · Fax 05323 933-100
E-Mail: cutec@cutec.de
Internet: www.cutec.de
Publication:
Several times a year at irregular intervals. Issues can be ordered from the address above at no charge.
Send an E-mail to
cutec-news@cutec.de